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(54) **AL BOND PAD CLEAN METHOD**

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**H01L 21/02** (2006.01)

**H01L 23/00** (2006.01)

**H01L 21/3105** (2006.01)

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**H01L 23/31** (2006.01)

(52) **U.S. Cl.**

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2224/0401 (2013.01); **H01L 2224/05008** (2013.01); **H01L 2224/05011** (2013.01); **H01L 2224/05027** (2013.01); **H01L 2224/0558** (2013.01); **H01L 2224/05124** (2013.01); **H01L 2224/05144** (2013.01); **H01L 2224/05147** (2013.01); **H01L 2224/05155** (2013.01); **H01L 2224/05186** (2013.01); **H01L 2224/05572** (2013.01); **H01L 2224/05647** (2013.01); **H01L 2224/81022** (2013.01)

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USPC ..... **438/612–617**, **688**; **257/E21.59**  
See application file for complete search history.

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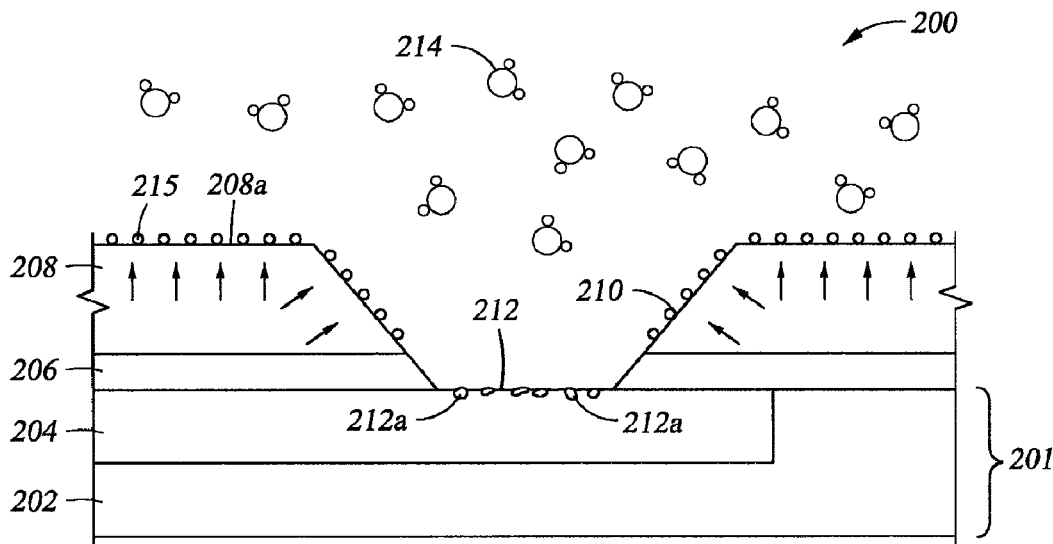
*Primary Examiner* — Thanhha Pham

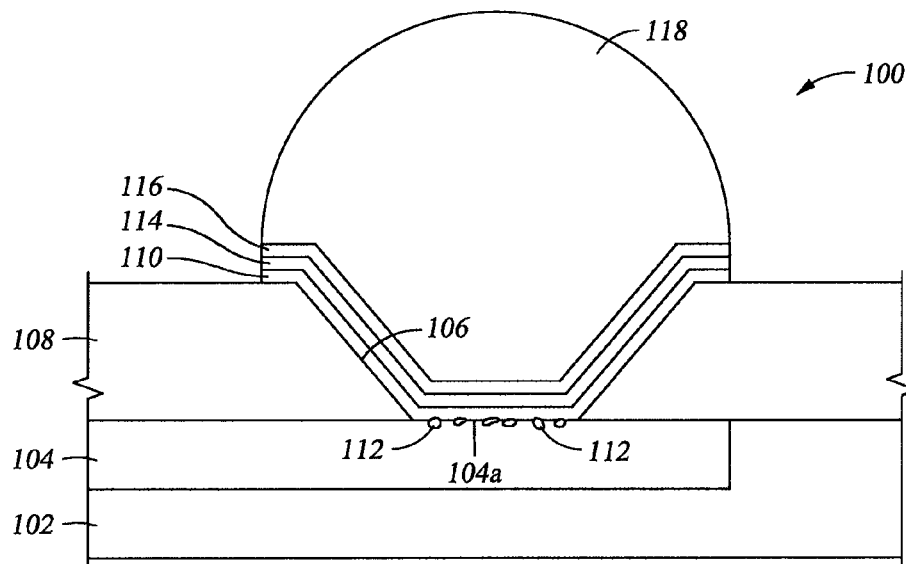
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(57) **ABSTRACT**

Embodiments of the present disclosure provide a method for controlling moisture from substrate being processed. Particularly, embodiments of the present disclosure provide methods for removing moisture from polymer materials adjacent bond pad areas. One embodiment of the present includes providing a moisture sensitive precursor and forming a compound from a reaction between the moisture to be controlled and the moisture sensitive precursor.

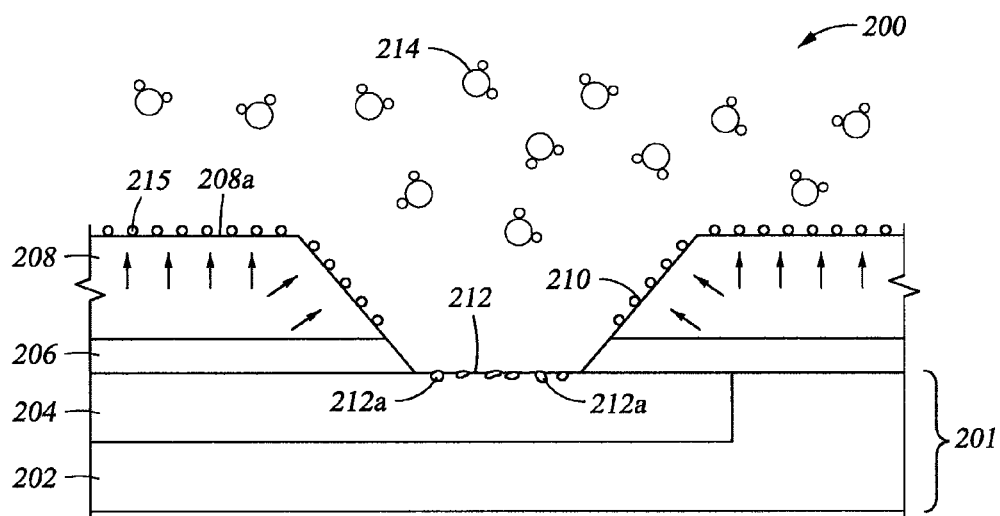
**15 Claims, 3 Drawing Sheets**





**Fig. 1**

(PRIOR ART)



**Fig. 2A**

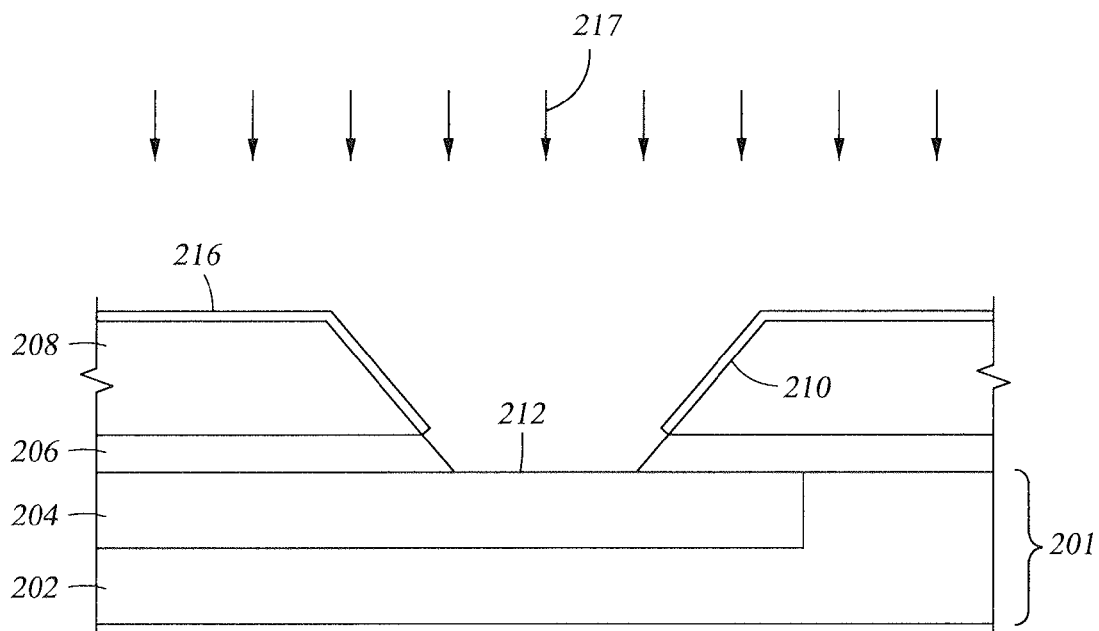


Fig. 2B

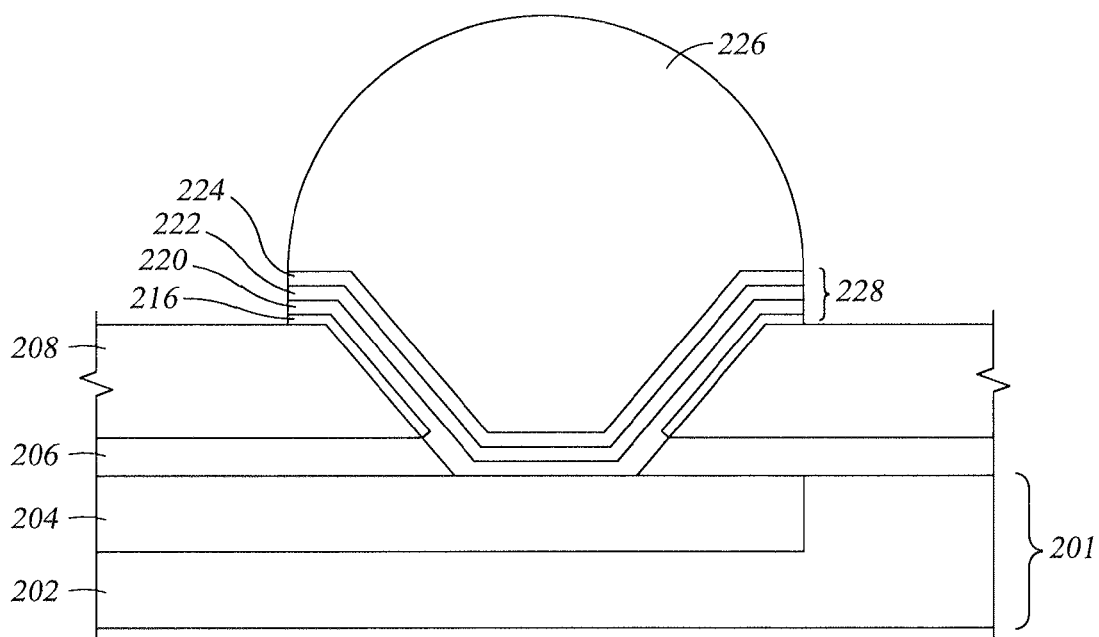
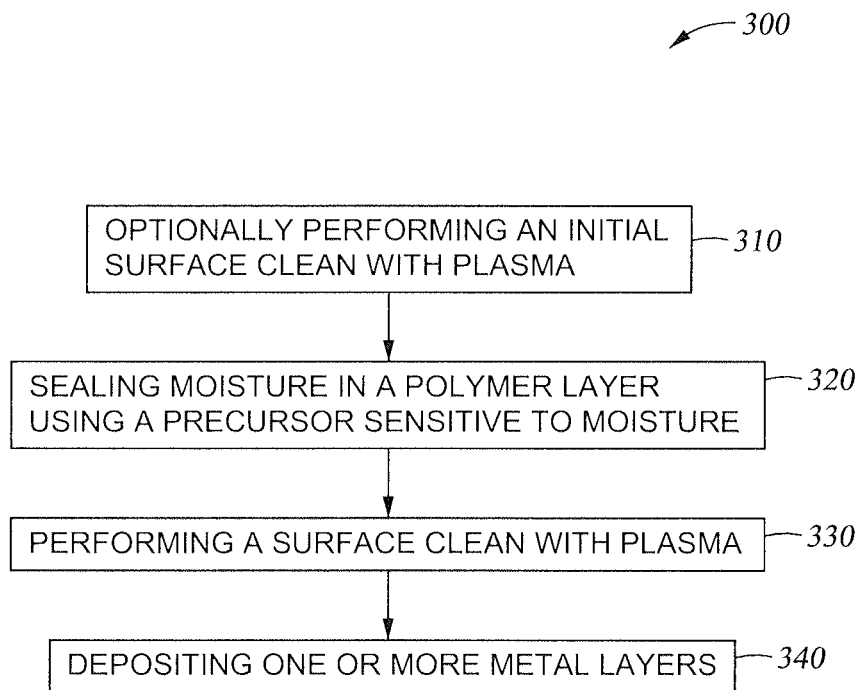


Fig. 2C

*Fig. 3*

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## AL BOND PAD CLEAN METHOD

## CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims benefit of U.S. Provisional Patent Application Ser. No. 61/718,113 filed Oct. 24, 2012, which is herein incorporated by reference.

## BACKGROUND

## 1. Field

Embodiments of the present disclosure relate to method for fabricating bond pads. More particularly, embodiments of the present disclosure provide methods for controlling moisture in polymer material during bond pad fabrication.

## 2. Description of the Related Art

During chip packaging, metal layers are used for connecting solder material to bond pads that are electrically connected to semiconductor devices. An insulating layer is usually formed over the bond pad and patterned to expose portions of the bond pad. The metal layers, such as under bump metallization (UBM) or redistribution layers, are then formed over the patterned insulating layer and the exposed bond pads.

Bond pads are usually made with a conductive material, such as aluminum, copper, tin, nickel, gold, or silver. For aluminum bond pads, polymer materials are increasingly used as the patterned insulating layer for UBM or redistribution layer. However, polymer materials typically contain large quantity of moisture. The moisture can contaminate freshly cleaned aluminum surfaces. Moisture contamination degrades contact resistance between the aluminum bond pads and the UBM or redistribution layers.

FIG. 1 is a prior art schematic side view of an under bump metallization structure **100** subjected to contamination caused by moistures in an adjacent polymer material. During packaging, a polymer layer **108** is deposited over a dielectric layer **102** and a device interconnect layer **104** of a fabricated device. The polymer layer **108** may be patterned to form a trench or via structure **106** exposing a bond pad area **104a**. Under bump metal layers **110**, **114** and **116** are then formed over the trench or via structure **106** and a solder material **118** is deposited thereafter to electrically connect the device interconnect layer **104**. However, before depositing the under bump metal layer **110**, moisture contained in the polymer material **108** usually contaminates the metal in the exposed bond pad area **104a** forming undesired contaminations **112** between the device interconnect layer **104** and the under bump metal layer **110**. The contaminations **112** reduce electrical conductivity between the device interconnect layer **104** and the under bump metal layer **110**.

Traditionally, cooling the substrate or cooling the processing chamber is used to reduce moisture in the polymer. However, the cooling method is time consuming and not effectively.

Therefore, there is a need for methods for removing moisture from polymer materials positioned adjacent aluminum bond pads.

## SUMMARY

Embodiments of the present disclosure provide a method for removing moisture from substrate being processed. Particularly, embodiments of the present disclosure provide methods for removing moisture from polymer materials adjacent bond pad areas.

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One embodiment of the present disclosure provides a method for processing a substrate. The method comprises removing moisture in one or more films on the substrate by providing a moisture sensitive precursor and forming a compound on the substrate from a reaction between the moisture in the one or more films and the moisture sensitive precursor.

Another embodiment of the present disclosure provides a method for forming under bump metal layers. The method comprises removing moisture from a polymer layer formed over a device interconnect layer. The polymer layer is patterned to expose a portion of the device interconnect layer, and removing moisture comprises providing a moisture sensitive precursor, and forming a compound from a reaction between the moisture in the polymer film and the moisture sensitive precursor. The method further comprises cleaning the exposed device interconnect layer with a plasma, and depositing one or more metal layers over the polymer layer and the exposed device interconnect layer.

Another embodiment of the present disclosure provides a method for removing moisture from a processing chamber. The method comprises flowing a moisture sensitive precursor to the processing chamber to react with moisture in the processing chamber.

## BRIEF DESCRIPTION OF THE DRAWINGS

So that the manner in which the above recited features of the present disclosure can be understood in detail, a more particular description of the disclosure, briefly summarized above, may be had by reference to embodiments, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical embodiments of this disclosure and are therefore not to be considered limiting of its scope, for the disclosure may admit to other equally effective embodiments.

FIG. 1 is a prior art schematic side view of an under bump metallization structure.

FIGS. 2A-2C are schematic views of an under bump metallization structure according to one embodiment of the present disclosure.

FIG. 3 is a flow chart reflecting a method for removing moisture in polymer during under bump metallization according to one embodiment of the present disclosure.

To facilitate understanding, identical reference numerals have been used, where possible, to designate identical elements that are common to the figures. It is also contemplated that elements and features of one embodiment may be beneficially incorporated on other embodiments without further recitation.

## DETAILED DESCRIPTION

Embodiments of the present disclosure provide methods for reducing contaminations in bond pads caused by moisture in an adjacent polymer layer. According to embodiments of the present disclosure, moisture in polymer material may be locked or sealed using a moisture sensitive gas or vapor. Particularly, the polymer material may be exposed to a metal precursor which reacts with moisture in the polymer material forming a metal oxide on the polymer material or within the polymer material. As a result, the moisture in the polymer material is locked in the metal oxide and contamination to the nearby bond pad area is prevented.

FIGS. 2A-2C are schematic views showing formation of an under bump metallization structure **200** according to one embodiment of the present disclosure.

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As shown in FIG. 2A, a device interconnect layer **204** is formed in a dielectric layer **202** of a semiconductor die **201**. The semiconductor die **201** may include active areas containing analog or digital circuit formed by one or more transistors, diodes, inductors, capacitors, resistors, and other circuit elements. The device interconnect layer **204** is generally made with a conductive material, such as aluminum, copper, tin, nickel, gold, silver, or combination thereof. The device interconnect layer **204** is electrically connected with the circuit elements formed in the semiconductor die **201**.

A passivation layer **206** is formed over the device interconnect layer **204** and the dielectric layer **202** of the semiconductor die **201**. The passivation layer **206** protects the device interconnect layer **204** and the dielectric layer **202** from moisture and oxygen. The passivation layer **206** may comprise silicon nitride ( $\text{Si}_3\text{N}_4$ ) or silicon oxide ( $\text{SiO}_2$ ).

A dielectric layer **208** is formed over the passivation layer **206**. The dielectric layer **208** may comprise a polymer, such as polyimide. The dielectric layer **208** may be formed over the passivation layer **206** by a spin-on application.

A via **210** may be formed through the dielectric layer **208** and the passivation layer **206** exposing a bond pad area **212** of the device interconnect layer **204**. The via **210** may be formed by patterning and etching.

As discussed above, the polymer in the dielectric layer **208** includes moisture. The moisture can outgas into the environment. After formation of the via **210**, the bond pad area **212** is exposed to the environment, including moisture outgassed from the polymer in the dielectric layer **208**. Contamination **212a** may be formed on the bond pad area **212** from reaction between the conductive material in the device interconnect layer **204** and the outgassed moisture.

According to embodiments of the present disclosure, a moisture sensitive precursor **214** may be applied to the polymer in the dielectric layer **208** to remove the moisture by reaction. The moisture sensitive precursor **214** may be supplied in the form of gas or vapor. The moisture sensitive precursor **214** removes the moisture in and/or around the polymer in the dielectric layer **208** by attracting and reacting with the moisture to form an oxide **215**. The moisture in the dielectric layer **208** may be drawn to a surface **208a** of the dielectric layer **208** forming the oxide **215** on the surface **208a**. The oxide **215** may also form inside the dielectric layer **208**. As a result, the moisture in the dielectric layer **208** is "locked".

According to embodiments of the present disclosure, the moisture sensitive precursor **214** may be any metal containing precursor suitable for forming a metal oxide or a metal by chemical vapor deposition. For example, the moisture sensitive precursor **214** may comprise one or more metal compounds. The moisture sensitive precursor **214** may comprise one or more compounds of aluminum, titanium, tantalum, zirconium, hafnium, vanadium, niobium or other suitable metal. In one embodiment, the moisture sensitive precursor **214** may be an amine of a metal, such as titanium, tantalum, zirconium, hafnium, vanadium, niobium, or other suitable metal. According to another embodiment of the present disclosure, the moisture sensitive precursor **214** may be a silicon containing precursor. For example, the moisture sensitive precursor **214** may comprise an amine silane.

As shown in FIG. 2B, the oxide **215** may form an oxide layer **216** on the surface **208a** of the dielectric layer **208**. The oxide layer **216** may be a continuous layer or a discontinuous layer depending on the amount of moisture abstracted from the dielectric layer **208**. When a continuous oxide layer **216** is formed, the oxide layer **216** may also function as a barrier layer to prevent any additional moisture in the dielectric layer

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**208** from outgassing into the environment during subsequent, thus stopping further contamination.

After the moisture in the dielectric layer **208** has been removed or sealed using the moisture sensitive precursor **214**, a plasma cleaning process may be performed to remove any contaminations. As shown in FIG. 2B, ions **217** may be directed toward the substrate to clean the surface of the substrate. The ions **217** may comprise argon ions. The contamination **212a** on the bond pad area **212** has been removed by the ions **217**. The oxide layer **216** remains attached to the surface **208a** of the dielectric layer **208** during the ionic cleaning process. After the plasma cleaning process, the cleaned bond pad area **212** can remain free of moisture contamination since moistures in the dielectric layer **208** is now locked in or by the oxide layer **216**.

As shown in FIG. 2C, under bump metallization layers **228** may be formed over the bond pad area **212** for further connection with a solder **226**. The under bump metallization layers **228** may include a stack of conformal metal layers. FIG. 2C illustrates an exemplary under bump metallization layers **228** including a conformal aluminum layer **220** directly deposited on the bond pad area **212** and the oxide layer **216**, a conformal nickel vanadium layer **222** deposited over the conformal aluminum layer **220**, and a conformal copper layer **224** formed over the conformal nickel vanadium layer **222**.

Alternatively, redistribution layers may be formed over the bond pad area **212** for flip-chip packaging. The redistribution layers may include a conformal titanium layer formed directly over the bond pad area **212** and the oxide layer **216**, and a copper redistribution layer formed over the conformal titanium layer.

FIG. 3 is a flow chart reflecting a method **300** for removing moisture in polymer according to one embodiment of the present disclosure. The method **300** may be used to remove moisture and clean bond pad prior to under bump metallization formation or redistribution layer formation.

In box **310**, an optional plasma surface clean may be performed to bond pad areas and polymer materials around the bond pad areas. For example, a substrate to be processed may have a patterned dielectric layer comprising polymer formed over bond pad layer to expose bond pad areas. The optional plasma surface clean may be performed by directing argon plasma towards a surface of the substrate being processed. The optional plasma surface cleaning can remove contaminations formed on the bond pad area and remove a portion of moisture in the polymer material. The plasma surface cleaning process may be performed in a plasma pre-clean chamber attached to a processing system for physical vapor deposition.

In box **320**, the polymer material is exposed to a moisture sensitive precursor to seal moisture in the polymer material. The moisture sensitive precursor may be delivered toward the polymer material in the form of vapor or gas. The moisture sensitive precursor attracts the moisture in the polymer material and reacts with the moisture to form an oxide on the surface of the polymer material, thus, locking the moisture in the form of oxide. Additionally, a layer of oxide may be formed on the surface of the polymer material, thus, sealing any remaining moisture in the polymer material from exiting and causing contamination.

According to one embodiment of the present disclosure, the process in box **320** may be performed in various chambers in a processing system for physical vapor deposition system. For example, the process may be performed in an outgas chamber, a load lock chamber with gas delivery capacity, or

the same plasma cleaning chamber for performing process described in box 310. During operation, the substrate may remain at room temperature.

The moisture sensitive precursor is similar to the moisture sensitive precursor 214 described with FIG. 2A above. The oxide formed on the polymer material may be similar to the oxide 215 and the oxide layer 216 described in FIGS. 2A-2B. The moisture sensitive precursor may comprise one or more metal containing precursors suitable for forming metal oxide or metal by chemical vapor deposition. The moisture sensitive precursor may comprise one or more compound of aluminum, titanium, tantalum, zirconium, hafnium, vanadium, niobium or other suitable metal. In one embodiment, the moisture sensitive precursor may be amine of a metal, such as titanium, tantalum, zirconium, hafnium, vanadium, niobium, or other suitable metal.

According to one embodiment of the present disclosure, the moisture sensitive precursor may comprise an aluminum precursor and the oxide comprises aluminum oxide. Suitable aluminum precursor may be one of DMAH (dimethyl-aluminum-hydride,  $(\text{CH}_3)_2\text{Al}-\text{H}$ ), TEA (tri-ethyl-aluminum,  $\text{Al}_2(\text{CH}_2\text{CH}_3)_6$ ), TMA (tri-methyl-aluminum,  $\text{Al}_2(\text{CH}_3)_6$ ), MPA (methyl pyrrolidine alane,  $\text{C}_5\text{H}_{14}\text{AlN}$ ), TMAAB (trimethylaminealane borane,  $\text{C}_3\text{H}_{15}\text{AlBN}$ ), TTBA (Tri-tertiary-butyl-aluminum,  $((\text{CH}_3)_3\text{C}_3\text{Al})$ , aluminum hydride ( $\text{AlH}_3$ ), Triisobutylaluminum  $([(\text{CH}_3)_2\text{CHCH}_2]_3\text{Al})$ , Tris (dimethylamido)aluminum  $(\text{Al}(\text{N}(\text{CH}_3)_2)_3)$ , or combinations thereof.

According to one embodiment of the present disclosure, the moisture sensitive precursor may comprise a tantalum precursor and the oxide comprises tantalum oxide. Suitable tantalum precursor may be one of pentakis(dimethylamino) tantalum  $(\text{Ta}(\text{N}(\text{CH}_3)_2)_5)$ , tantalum ethoxide  $(\text{Ta}(\text{OC}_2\text{H}_5)_5)$ , tris(diethylamido)(tert-butylimido)tantalum  $((\text{CH}_3)_3\text{CNTa}(\text{N}(\text{C}_2\text{H}_5)_2)_3)$ , tris(diethylamido)(ethylimido)tantalum  $(\text{C}_2\text{H}_5\text{NTa}(\text{N}(\text{C}_2\text{H}_5)_2)_3)$ , tris(ethylmethyldamido)(tert-butylimido)tantalum  $(\text{C}_{13}\text{H}_{33}\text{N}_4\text{Ta})$ , or combinations thereof.

According to one embodiment of the present disclosure, the moisture sensitive precursor may comprise a zirconium precursor and the oxide comprises zirconium oxide. Suitable zirconium precursor may be one of bis(cyclopentadienyl) zirconium dihydride  $(\text{C}_{10}\text{H}_{12}\text{Zr})$ , bis(methyl- $\eta^5$ -cyclopentadienyl)methoxymethyl zirconium  $(\text{Zr}(\text{CH}_3\text{C}_5\text{H}_4)_2\text{CH}_3\text{OCH}_3)$ , dimethylbis(pentamethylcyclopentadienyl)zirconium  $(\text{C}_{22}\text{H}_{36}\text{Zr})$ , tetrakis(diethylamido)zirconium  $([(\text{C}_2\text{H}_5)_2\text{N}]_4\text{Zr})$ , tetrakis(diethylamido)zirconium  $([(\text{CH}_3)_2\text{N}]_4\text{Zr})$ , tetrakis(ethylmethyldamido)zirconium  $(\text{Zr}(\text{NCH}_3\text{C}_2\text{H}_5)_4)$ , Zirconium diisopropoxidebis(2,2,6,6-tetramethyl-3,5-heptanedionate)  $(\text{Zr}(\text{OCC}(\text{CH}_3)_3\text{CHCOC}(\text{CH}_3)_3)_2(\text{OC}_3\text{H}_7)_2)$ , zirconium tetrakis(2,2,6,6-tetramethyl-3,5-heptanedionate)  $(\text{Zr}(\text{OCC}(\text{CH}_3)_3\text{CHCOC}(\text{CH}_3)_3)_4)$ , or combinations thereof.

According to one embodiment of the present disclosure, the moisture sensitive precursor may comprise a titanium precursor and the oxide comprises titanium oxide. Suitable titanium precursor may be one of tetrakis(dimethylamido) titanium (TDMAT,  $[(\text{CH}_3)_2\text{N}]_4\text{Ti}$ ), bis(tert-butylcyclopentadienyl)titanium  $(\text{C}_{18}\text{H}_{26}\text{Cl}_2\text{Ti})$ , bis(diethylamido)bis(dimethylamido)titanium  $(\text{Ti}(\text{N}(\text{CH}_3)_2)_2(\text{N}(\text{CH}_2\text{CH}_3)_2)_2)$ , tetrakis(diethylamido)titanium  $([(\text{C}_2\text{H}_5)_2\text{N}]_4\text{Ti})$ , tetrakis(ethylmethyldamido)titanium  $([(\text{CH}_3\text{C}_2\text{H}_5)_2\text{N}]_4\text{Ti})$ , titanium diisopropoxidebis(2,2,6,6-tetramethyl-3,5-heptanedionate)  $(\text{Ti}[\text{OCC}(\text{CH}_3)_3\text{CHCOC}(\text{CH}_3)_3]_2(\text{OC}_3\text{H}_7)_2)$ , titanium isopropoxide  $(\text{Ti}[\text{OCH}(\text{CH}_3)_2]_4)$ , titanium tetrachloride  $(\text{TiCl}_4)$ , or combinations thereof.

According to one embodiment of the present disclosure, the moisture sensitive precursor may comprise a hafnium

precursor and the oxide comprises hafnium oxide. Suitable hafnium precursor may be one of bis(tert-butylcyclopentadienyl)dimethyl hafnium  $(\text{C}_{20}\text{H}_{32}\text{Hf})$ , bis(methylcyclopentadienyl)dimethyl hafnium  $(\text{Hf}[\text{C}_5\text{H}_4(\text{CH}_3)]_2(\text{CH}_3)_2)$ , bis(methylcyclopentadienyl)methoxymethylhafnium  $(\text{HfCH}_3(\text{OCH}_3)[\text{C}_5\text{H}_4(\text{CH}_3)]_2)$ , bis(trimethylsilyl)amidohafnium chloride  $([(\text{CH}_3)_3\text{Si}]_2\text{N}_2\text{HfCl}_2)$ , dimethylbis(cyclopentadienyl) hafnium  $((\text{C}_5\text{H}_5)_2\text{Hf}(\text{CH}_3)_2)$ , hafnium tert-butoxide  $(\text{Hf}[\text{OC}(\text{CH}_3)_3]_4)$ , hafnium isopropoxide isopropanol adduct  $(\text{C}_{12}\text{H}_{28}\text{HfO}_4)$ , tetrakis(diethylamido)hafnium  $([(\text{CH}_2\text{CH}_3)_2\text{N}]_4\text{Hf})$ , tetrakis(dimethylamido)hafnium  $([(\text{CH}_3)_2\text{N}]_4\text{Hf})$ , tetrakis(ethylmethyldamido)hafnium  $([(\text{CH}_3)(\text{C}_2\text{H}_5)\text{N}]_4\text{Hf})$ , and combinations thereof.

According to one embodiment of the present disclosure, the moisture sensitive precursor may comprise a vanadium precursor and the oxide comprises vanadium oxide. Suitable hafnium precursor may be one of bis(cyclopentadienyl)vanadium  $(\text{V}(\text{C}_5\text{H}_5)_2)$ , bis(ethylcyclopentadienyl)vanadium  $(\text{C}_{14}\text{H}_{18}\text{V})$ , vanadium oxytriisopropoxide  $(\text{OV}(\text{OCH}(\text{CH}_3)_2)_3)$ , and combinations thereof.

According to one embodiment of the present disclosure, the moisture sensitive precursor may comprise a silicon precursor and the oxide comprises a silicon oxide. Suitable silicon precursor may be an aminesilane, such as  $\text{SiH}_2(\text{N}(\text{C}_2\text{H}_5)_2)_2$ ,  $\text{Si}_2(\text{C}_2\text{H}_5)_6$ ,  $\text{SiH}(\text{N}(\text{CH}_3)_2)_3$ , or trisilylamine (TSA).

In box 330, a plasma cleaning is performed after sealing the moisture in the polymer material. The plasma cleaning may be similar to the plasma cleaning described in FIG. 2B. In one embodiment, the plasma cleaning may be performed by sputtering the surface of the substrate with argon plasma. The plasma cleaning may be used to remove any residue contamination on the bond pad area or remove any loose particles generated during the moisture sealing process described above. The plasma cleaning process may be performed in a pre-clean chamber in the processing system for performing physical vapor deposition.

In box 340, one or more metal layers may be formed over the bond pad areas for under bump metallization, redistribution layer, or other device structures. The one or more metal layers may be conformal layers similar to metal layers 220, 222, 224 as shown in FIG. 2C. The one or more metal layers may be formed by physical vapor deposition. The one or more metal layers may be formed using one or more physical vapor deposition chambers included on the processing system.

The method 300 may be performed in a processing system including a transfer chamber, one or more physical vapor deposition chambers coupled to the transfer chamber, a pre-clean chamber coupled to the transfer chamber, and at least one load lock chamber coupled to the transfer chamber.

During processing, the substrate being processed may enter the processing system through the load lock chamber to the transfer chamber, then to the pre-clean chamber, wherein the optional plasma cleaning of box 310 is performed. The moisture sealing process described in box 320 may then be processed in the pre-clean chamber. Alternatively, the substrate may be transferred from the pre-clean chamber to the load lock chamber or other service chamber for the moisture sealing process. When the optional plasma cleaning is not performed, the substrate being processed may be directly transferred to the perspective chamber for moisture sealing process. After the moisture sealing process, the plasma cleaning described in box 330 is performed in the pre-cleaning chamber. The substrate is then transferred to the one or more physical vapor deposition chambers for forming one or more metal layers as described in box 340.

Even though removing moisture from dielectric layers in a substrate being processed is described above, embodiments

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of the present disclosure may be used in any suitable situation for removing moisture. For example, embodiments of the present disclosure may be used in removing moisture from inner surfaces of a processing chamber.

While the foregoing is directed to embodiments of the present disclosure, other and further embodiments of the disclosure may be devised without departing from the basic scope thereof, and the scope thereof is determined by the claims that follow.

The invention claimed is:

1. A method for processing a substrate, comprising:  
removing moisture in one or more films on the substrate by:  
providing a moisture sensitive precursor that is a gas or vapor, wherein the moisture sensitive precursor comprises a metal or silicon; and  
forming a compound on the substrate from a reaction between the moisture in the one or more films and the moisture sensitive precursor, wherein the compound comprises an oxide of the metal or silicon.
2. The method of claim 1, wherein the one or more films comprise a polymer film.
3. The method of claim 2, wherein the polymer film is disposed over a metal film, and the polymer film is patterned to expose a portion of the metal film.
4. The method of claim 3, further comprising cleaning a surface of the substrate using a plasma.
5. The method of claim 4, wherein the cleaning the surface of the substrate using a plasma is performed after removing moisture in one or more films on the substrate.
6. The method of claim 5, further comprising cleaning the surface of the substrate using a plasma prior to removing moisture in one or more films on the substrate.
7. The method of claim 1, wherein the moisture sensitive precursor comprises one of one or more of silicon, aluminum, titanium, tantalum, zirconium, hafnium, vanadium, or niobium.
8. A method for forming under bump metal layers, comprising:  
removing moisture from a polymer layer formed over a device interconnect layer, wherein the polymer layer is patterned to expose a portion of the device interconnect layer, and removing moisture comprises:  
providing a moisture sensitive precursor that is a gas or vapor; and  
forming a compound from a reaction between the moisture in the polymer layer and the moisture sensitive precursor;  
cleaning the exposed device interconnect layer with a plasma; and  
depositing one or more metal layers over the polymer layer and the exposed device interconnect layer.
9. The method of claim 8, further comprising cleaning the polymer layer and the exposed device interconnect layer with a plasma prior to removing moisture from the polymer layer.

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10. The method of claim 8, wherein the device interconnect layer comprises aluminum.

11. The method of claim 10, wherein the polymer layer comprises polyimide.

12. The method of claim 10, wherein the moisture sensitive precursor comprises aluminum.

13. The method of claim 8, wherein the moisture sensitive precursor comprises one or more of silicon, aluminum, titanium, tantalum, zirconium, hafnium, vanadium, or niobium.

14. A method for forming under bump metal layers, comprising:

removing moisture from a polymer layer formed over a device interconnect layer, wherein the polymer layer is patterned to expose a portion of the device interconnect layer, and removing moisture comprises:

providing a moisture sensitive precursor, wherein the moisture sensitive precursor comprises an amine of titanium, tantalum, zirconium, hafnium, vanadium, or niobium; and

forming a compound from a reaction between the moisture in the polymer layer and the moisture sensitive precursor;

cleaning the exposed device interconnect layer with a plasma; and

depositing one or more metal layers over the polymer layer and the exposed device interconnect layer.

15. A method for forming under bump metal layers, comprising:

removing moisture from a polymer layer formed over a device interconnect layer, wherein the polymer layer is patterned to expose a portion of the device interconnect layer, and removing moisture comprises:

providing a moisture sensitive precursor, wherein the moisture sensitive precursor comprises one of DMAH (dimethyl-aluminum-hydride,  $(\text{CH}_3)_2\text{Al}-\text{H}$ ), TEA (tri-ethyl-aluminum,  $\text{Al}_2(\text{CH}_2\text{CH}_3)_6$ ), TMA (tri-methyl-aluminum,  $\text{Al}_2(\text{CH}_3)_6$ ), MPA (methyl pyrrolidine alane,  $\text{C}_5\text{H}_{14}\text{AlN}$ ), TMAAB (trimethylaminealane borane,  $\text{C}_3\text{H}_{15}\text{AlBN}_2$ ), TTBA (Tri-tertiary-butyl-aluminum,  $((\text{CH}_3)_3\text{C}_3\text{Al})$ , aluminum hydride ( $\text{AlH}_3$ ), Triisobutylaluminum ( $[(\text{CH}_3)_2\text{CHCH}_2]_3\text{Al}$ ), Tris(dimethylamido)aluminum ( $\text{Al}(\text{N}(\text{CH}_3)_2)_3$ ), or combinations thereof; and

forming a compound from a reaction between the moisture in the polymer layer and the moisture sensitive precursor;

cleaning the exposed device interconnect layer with a plasma; and

depositing one or more metal layers over the polymer layer and the exposed device interconnect layer.

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